

No. 637,550.

Patented Nov. 21, 1899.

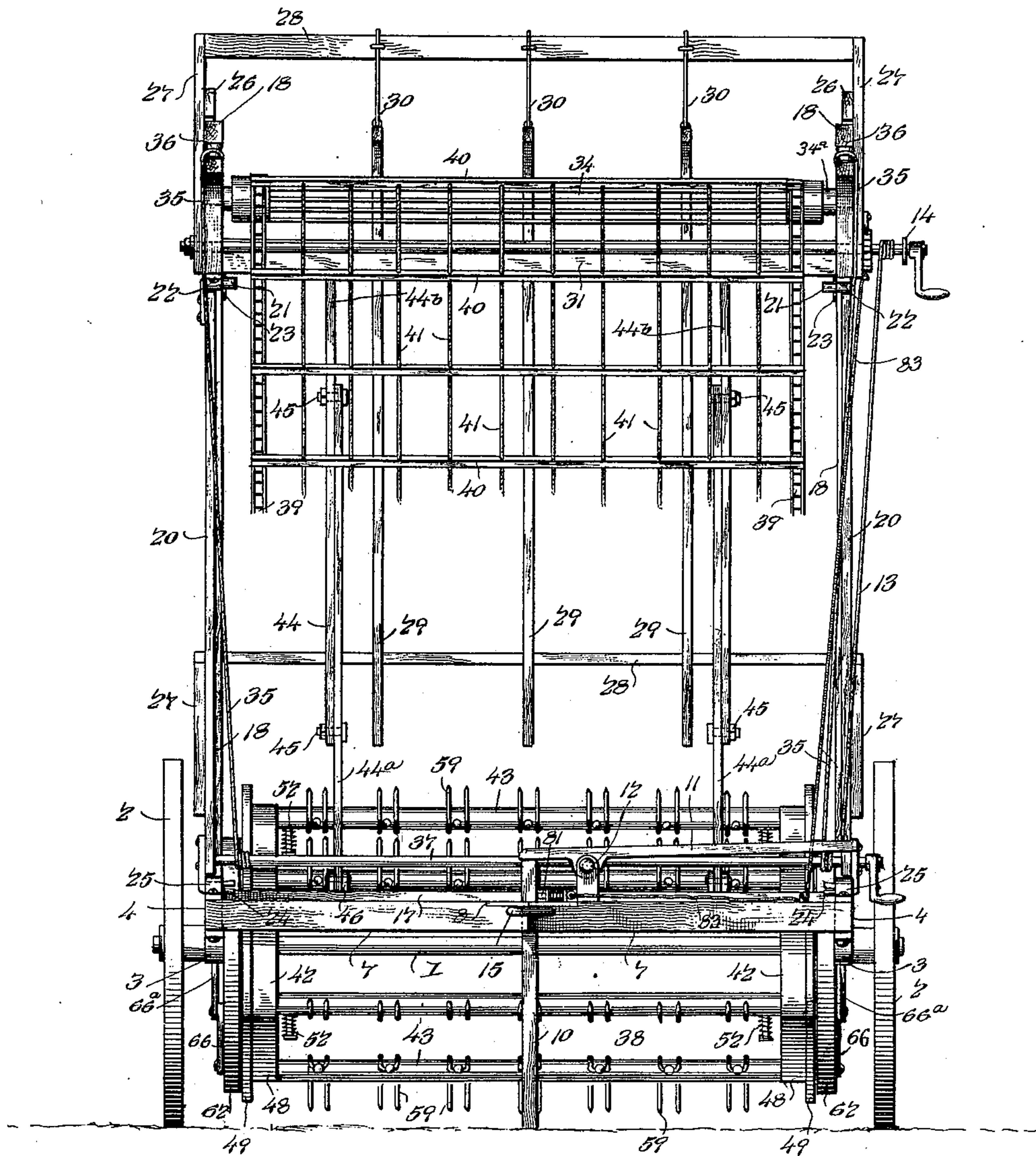
S. FERGUSON.
HAY LOADER.

(Application filed May 17, 1899.)

No Model.)

4 Sheets—Sheet 1.

Fig. 1.



Witnesses

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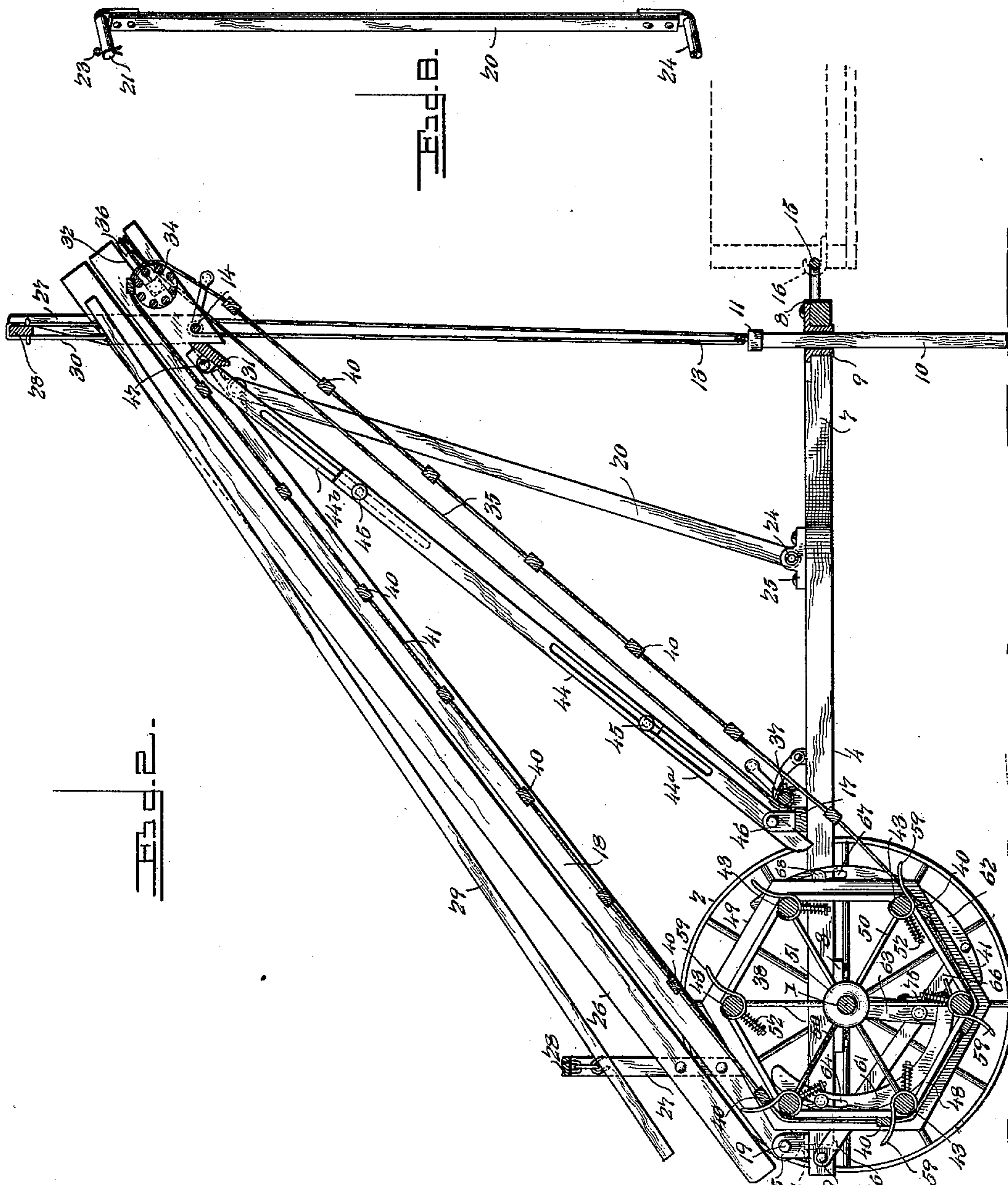
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(Application filed May 17, 1899.)

(No Model.)

4 Sheets—Sheet 2.



WITNESSES

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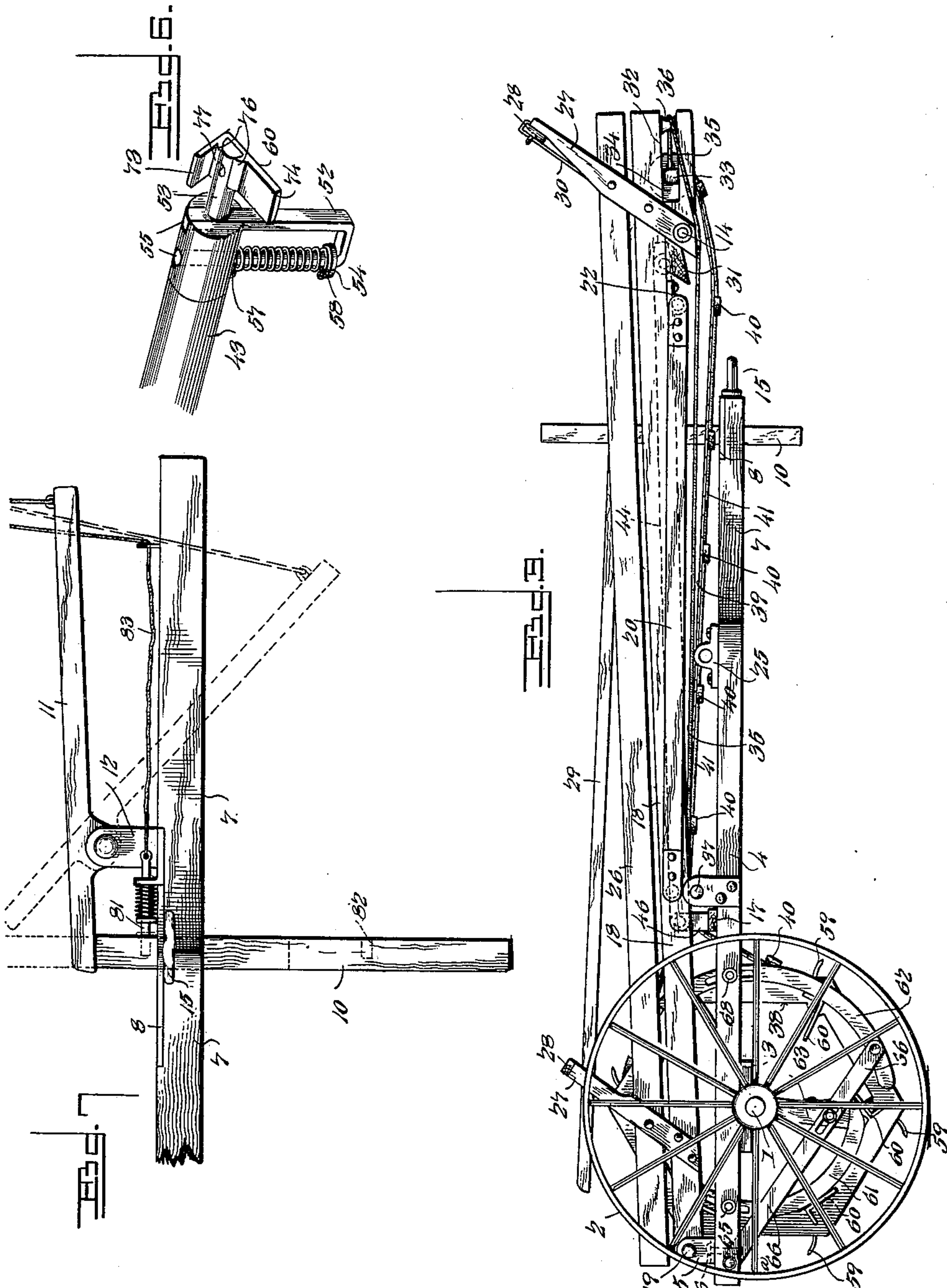
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4 Sheets—Sheet 3.



Witnesses

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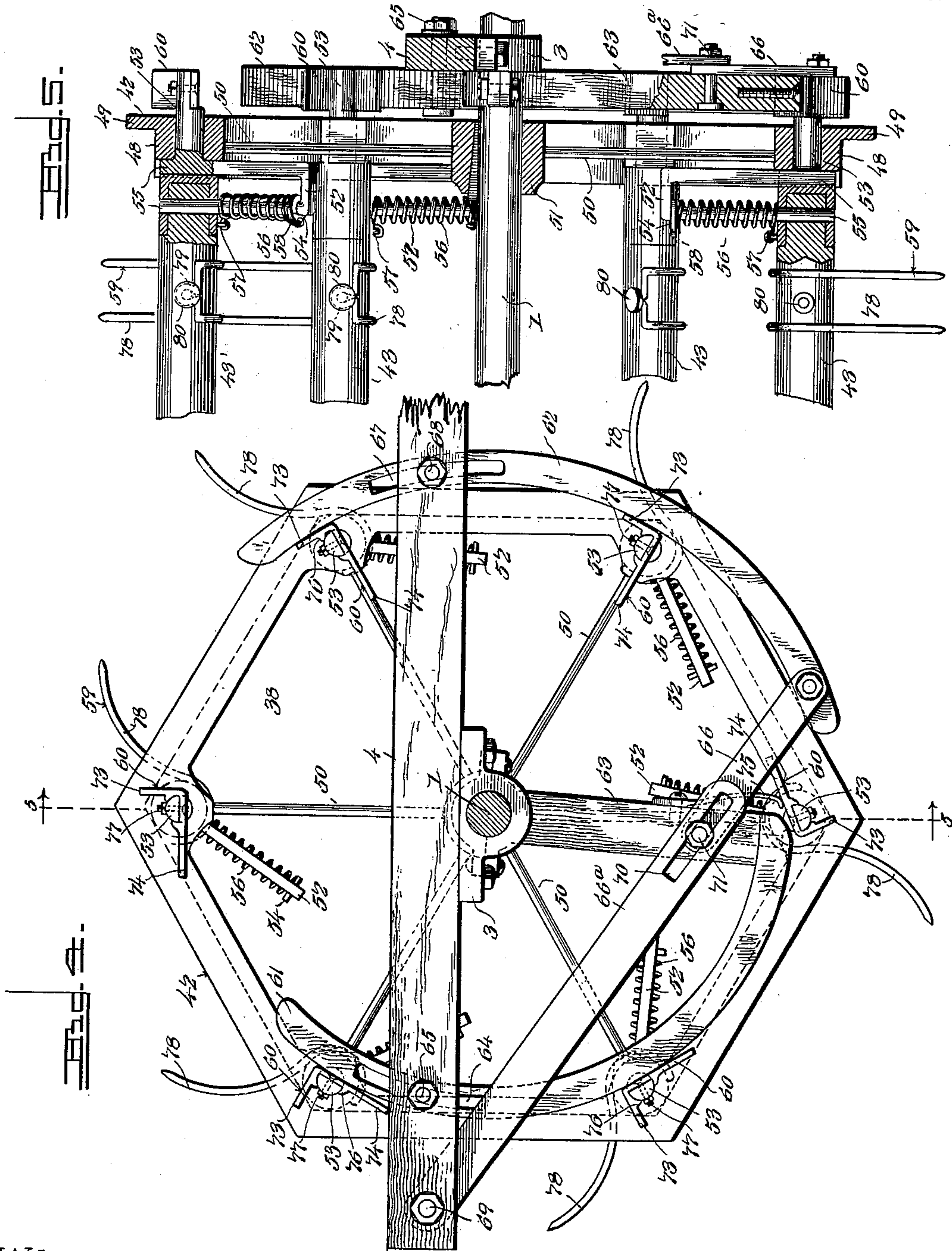
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4 Sheets—Sheet 4.



Witnesses

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UNITED STATES PATENT OFFICE.

SAMUEL FERGUSON, OF HAZLE GREEN, IOWA.

HAY-LOADER.

SPECIFICATION forming part of Letters Patent No. 637,550, dated November 21, 1899.

Application filed May 17, 1899. Serial No. 717,234. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL FERGUSON, a citizen of the United States, residing at Hazle Green, in the county of Delaware and State of Iowa, have invented a new and useful Hay-Loader, of which the following is a specification.

My invention relates to hay-loaders of the class in which hay is raked from the swath, carried upward and forward, and deposited in a preceding vehicle, and has for its objects to simplify, improve, and strengthen the construction of machines employed for this purpose, to provide a construction whereby the machine may be folded for transportation and storage or to reduce the effect of wind thereon, to provide improved means for operating the picker-staffs, and to insure the efficient raising and holding of the hay.

Further objects and advantages of this invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings, Figure 1 is a front view of a hay-loader constructed in accordance with my invention. Fig. 2 is a longitudinal vertical section of the same. Fig. 3 is a side view showing the machine folded. Fig. 4 is a detail side view to show the means whereby the picker-staffs are rocked. Fig. 5 is a detail sectional view of the same. Fig. 6 is a detail perspective view of one end of a picker-staff, to show the means for mounting and cushioning said staffs. Fig. 7 is a detail front view of a portion of the machine, showing the lock whereby the frame is secured in its adjusted positions with relation to the front standard. Fig. 8 is a detail view in perspective of one of the carrier-frame braces.

Similar reference characters indicate corresponding parts in all the figures of the drawings.

1 designates an axle or driving-shaft carrying loose drive-wheels 2, which are connected with the axle to communicate forward motion thereto by means of clutches of the ordinary construction, (not shown,) and said axle is journaled adjacent to the drive-wheels in bearings 3 on the parallel side frame-bars 4. Said frame-bars extend rearward beyond the bearings for the main or drive shaft and

are provided at their rear ends with swivel bearing-clips 5, each of which consists of a parallel-eared clip arranged upon the upper side of the frame-bar and a single bolt or spindle 6, extending downward through the frame-bar and provided at its lower end with a nut, whereby the clip may be secured in an adjusted position. At their front ends the side frame-bars are connected by forwardly-convergent horizontal brace-bars 7, which are firmly secured at their adjacent extremities to a coupling-plate 8, having an opening in registration with a depending socket-tube 9, in which is fitted a vertical front frame support or standard 10, said standard being vertically adjustable to tilt the main frame, consisting of the side bars 4 and braces 7, upon the main shaft or axle as a center. This standard is held at the desired adjustment to maintain the front end of the frame at the required elevation by means of a lever 11, which is fulcrumed at an intermediate point in a bearing-clip 12, bears downwardly at the extremity of its short arm upon the upper end of the standard, and is connected at the extremity of its long arm by a cord, chain, or other flexible means 13 with a windlass or other adjusting device 14, which is mounted upon the carrier-frame, which forms a portion of the superstructure of the hay-loader and is hereinafter described. This windlass or adjusting device being arranged at an elevation is within reach of an operator stationed upon the top of a load in a vehicle preceding the loader, and by tilting the lever to raise the front end of the main loader-frame the clevis 15, which is arranged at the meeting extremities of the braces 7, may be disengaged from a draft-hook 16 on the rear end of the preceding vehicle, of which the rear end is indicated in dotted lines in Fig. 2. The side frame-bars 4 are also connected at an intermediate point in advance of the drive chain or axle by means of a transverse brace 17, which serves to give stiffness to the frame.

Mounted at their lower rear extremities in the above-described swiveled bearing-clips 5 are the side carrier-frame bars 18, said side bars being pivotally mounted by means of fulcrum pins or bolts 19 and extending upward and forward therefrom in an inclined position in the vertical planes, respectively,

of the side main frame-bars, said side carrier-frame bars being supported at the desired inclination by means of braces 20, which are pivotally mounted at their upper ends upon the carrier-frame bars. In the construction illustrated said braces are provided at their upper ends with lateral pivot-pins 21, fitted in bearings 22 on the carrier-frame bars and held from displacement by means of split keys 23, and at their lower ends said braces are provided with transverse split pins 24, engaged with eyes or keepers 25 on the side bars 4. To fold the frame of the loader, as hereinafter more particularly explained, it is only necessary to disengage the lower extremities of said braces from the main frame and lower the carrier-frame until it occupies a position parallel with the main frame, as indicated in Fig. 3, thus adapting the machine to be housed in an ordinary shed or building, and thus to be completely protected when not in use.

Arranged above and in the vertical planes, respectively, of the side carrier-frame bars are guards 26, which are preferably spaced at their lower edges from the upper edges of the said side bars and are held in position by means of bracket-bars 27, which perform the additional function of supporting upper and lower cross-bars 28, from which are loosely suspended holding-bars 29, connected with the cross-bars by means of looped hangers 30 at their upper ends and through the medium of staples at their lower ends and links connecting said staples, as shown in Fig. 2 of the drawings. The hangers 30 are adapted to slide upon the side faces of the upper cross-bar 28, at which time longitudinal movement of the holding-bars will be permitted by the staple-and-link connections. Thus the holding-bars may have a movement toward and away from the carrier-apron, hereinafter described, and thus bear yieldingly upon the hay during the elevating operation and prevent displacement of the latter.

The side carrier-frame bars are connected near their upper ends by a transverse brace 31, above which said side bars are slotted to form guides 32, in which fit the angular terminals 33 of a transverse drum-spindle 34^a, and connected to said drum-spindle are chains or cables 35, (shown in Fig. 2 of the drawings,) which extend upward around direction-pulleys 36 and thence downward to a windlass 37, which is mounted upon the main frame and by which the operator is enabled to vary the position of the drum-spindle, and therewith the upper drum 34, carried thereby in a direction parallel with the carrier-frame.

Mounted upon the drive-shaft 1 is a carrier-drum 38, traversed by the carrier-apron, consisting of carrier-chains 39, slats 40, and flexible filling cords or ropes 41. The lower portion of the carrier-apron traverses the picker-cylinder, consisting of cylinder-heads 42, having their hubs secured to the main shaft or axle 1, and picker-staffs 43, arranged par-

allel with said shaft and connecting the cylinder-heads. In advance of the picker-cylinder are arranged inclined guides 44, which are of extensible construction, consisting of members 44^a and 44^b, which are slotted and connected by transverse guide-pins 45 to slide relatively to each other when the machine-frame is folded, the lower extremities of said braces being pivotally mounted by means of clips 46 upon the transverse brace 17, and at their upper ends by means of clips 47 upon the transverse brace 31 of the carrier-frame. These guides serve to prevent the excessive sagging of the upper or operative side of the carrier-apron and insure the proper elevation of the upper portion thereof to the plane of the upper side of the drum to discharge the hay. I have found in practice that the side bars of the carrier-frame are liable to warp slightly, and thus interfere with the proper attachment of their lower rear extremities to the main or horizontal frame; but by employing the swiveled clips for forming this connection it is possible to turn the clips to suit the positions of the adjacent ends of the carrier side bars, and thus insure a proper alignment of the apron or a proper position of the upper carrier-drum with its axis parallel with that of the picker-cylinder, whereby the apron travels properly in operation. The means described for mounting the carrier-frame upon the main or horizontal frame adapts the machine to be taken apart for shipment, and thereby materially reduces the cost of transportation.

The cylinder-heads consist of rims 48 of polygonal construction, provided at their outer edges with outwardly-extending flanges 49, whereby the carrier-chains which traverse said rims are held from lateral displacement, while the polygonal faces of the rims serve to communicate motion efficiently from the cylinder to the carrier-apron, and said rims are connected by spokes 50 with the hubs 51. At intervals the rims of the cylinder-heads are cut away to receive the extremities of the picker-staffs 43, and secured to the extremities of the picker-staffs are crank arms or hangers 52, having spindles 53, which are mounted to rock in bearings in the cylinder-heads. (See Fig. 6 of the drawings.) Said crank arms or hangers are provided at their inner ends with ears 54, from which parallel with the arms extend guide-pins 55, which fit in guide-perforations which are formed in castings or ferrules on the extremities of the picker-staffs, and coiled upon the guide-pins and terminally attached to the picker-staffs and said ears at the inner ends of the crank-arms are cushion-springs 56. In practice I prefer to provide said springs with terminal eyes which respectively interlock with eyes 57 on said ferrules and hooks 58 on said ears, and the springs are preferably loosely coiled to adapt them to yield in either direction, or, in other words, adapt them for either expansion or contraction, whereby the springs serve not

only to hold the picker-staffs from disengagement from the guide-pins, but to allow inward movement of the picker-staffs when the picker-teeth 59 come in contact with an obstacle, thus cushioning the picker-staffs to avoid injury to the picker-teeth.

The spindles of the picker-staffs extend beyond the outer surfaces of the heads of the picker-cylinder and are provided with cross-heads 60 for engagement by cams 61 and 62 to impart rocking movement alternately in opposite directions to the picker-staffs, this rocking movement having for its object to alternately fold and extend the picker-teeth; whereby during their upward movement from the lowermost point of the cylinder to the plane of the upper side of the carrier-apron said teeth are in a proper position for carrying the hay or other material and whereby during their downward movement at the front side of the cylinder said teeth are folded and are not extended until the point of operation is reached. The means which I have shown in the drawings for accomplishing this movement of the picker-staffs alternately in opposite directions include the operating and folding cams 61 and 62, as above indicated, the same being arranged, respectively, at the rear and front sides of the cylinder, are segmental in construction, are concentric with the cylinder, and are arranged, respectively, inside and outside of the path of the spindles of the picker-staffs. These cams are preferably constructed of bent wood and are suitably supported by the side bars of the main frame, the lower end of each operating-cam being attached to the lower extremity of a hanger 63, which is mounted upon the main shaft or axle between the planes of the main frame side bars and the adjacent cylinder-head, and is adapted to swing in a plane parallel therewith. The upper end of said operating-cam 61 is longitudinally slotted, as shown at 64, for engagement by a fastening device, such as a bolt 65, carried by the side bar. The folding-cam 62 is connected at its lower end with the said hanger by means of a brace-bar 66 and is slotted near its upper end, as shown at 67, for engagement by a fastening device, such as a bolt 68, also engaged with the side bar of the main frame. Hence by loosening these fastening devices the cams, with the hanger by which their lower extremities are supported and held in the desired relative positions, may be tilted or swung forward or rearward to arrange the interval between the lower ends of said cams at any desired points in the paths of the cross-heads, it being understood that by mounting the hanger upon the main shaft or axle the adjustment of the adjacent lower ends of the cams is in a direction concentric with the shaft. After attaining the desired adjustment the parts may be locked in a fixed position by tightening the fastening-bolts. As an additional means of bracing the members of the cam, however, I preferably extend a brace 66^a in an oblique

direction from the hanger to the plane of the side bars of the main frame and engage it at its upper end by a fastening device consisting in the construction illustrated of a bolt 69. This brace-bar, however, is slotted, as shown at 70, to allow its adjustment with relation to the hanger, said slot being engaged by a bolt 71 on the hanger, whereby the movement of the cams concentric with the shaft or axle does not strain the brace at its points of attachment to the frame and hanger. Thus to adjust the cams it is necessary first to loosen the intermediate bolt 71 and loosen the fastening devices by which the upper ends of the cams and brace-bar are attached to the side frame-bar, and after the cams have been arranged in the desired position the bolt 71 and said fastening devices may be tightened to properly secure the parts and render the brace operative.

Owing to the above-described arrangement of parts there is no projection of the picker-staff-supporting devices beyond the outer surfaces of the staffs, and hence the catching of the carrier-chains in traversing the cylinder is prevented. Furthermore, by cutting away the inner edges of the cylinder-head rims for the reception of the adjacent extremities of the picker-staffs the crank-arms are arranged in the vertical planes of the rims of the heads of the carrier-drum, and said wheel-rims will thus serve to limit or prevent excessive swinging movement of the crank-arms after the cross-heads are disengaged from the upper ends of the operating-cams. Each cross-head is preferably constructed with a short or folding arm 73 and a long or operating arm 74, the former preferably being slightly curved at its extremity or deflected to avoid a sharp contact thereof with the extremity of the folding-cam when the latter is reached by the cross-head. It is desirable, however, also to so arrange the parts as to cause the picker-teeth to assume a rearwardly and downwardly inclined position after the cross-heads have come in contact with the lower ends of the operating-cams to insure not only the raising but the efficient carrying of the hay by means of the picker-teeth. Thus the operating-arms of the cross-heads are disposed obliquely to the planes of the picker-teeth, whereby, as the said operating or long arms of the cross-heads are held in position approximately perpendicular to the radii of the cylinder, the picker-teeth are inclined with relation to said long arms and are drawn up to form an acute angle with the surface of the cylinder or the surface of the adjacent portion of the carrier-apron, as clearly shown in the drawings.

Furthermore, I have found it desirable to cushion the contact of the cross-heads with the operating-cams, and hence provide the hanger-bars at the front ends of the operating-cams with cushion-springs 75, which yield when the long arms of the cross-heads come in contact therewith to relieve the mechanism of jar. These cushion-springs also serve

to effectually complete the swinging movement of the cross-heads, and hence the turning of the picker-staffs to their operative positions.

5 The cross-heads, which comprise the long and short arms, as above described, are constructed of angle plates or irons, and the spindle extensions are flattened at one side to form seats, against which the long arms of
10 said plates or castings bear; also, the arms of the cross-head are provided with dovetailed or undercut ribs 76, which overhang and bear upon the adjacent portions of the surfaces of the spindle, thus requiring the
15 cross-heads to be applied to the spindles in an axial direction and adapt them to maintain their positions in opposition to the strain applied thereto even without the assistance of other fastening devices; but I prefer in
20 practice to include a bolt 77 for preventing displacement of the cross-heads in a direction parallel with the spindles.

In the drawings I have also illustrated a preferred form of picker-tooth, which I have
25 found to be of advantage by reason of being of such construction as to increase the capacity of the picker-cylinder and the efficiency thereof in accomplishing a complete gathering of the hay and also by reason of
30 its reduced cost of manufacture. Said tooth, which is illustrated at 78, is of double construction, in that it is formed of a loop, wherein the closed end is bent to partly encircle the picker-staff, and is provided with a closed
35 eye 79 for engagement by a tooth-securing bolt 80. The lower or operative extremities of the teeth may be of any desired shape, but being spaced apart and thus arranged upon
40 opposite sides of the longitudinal plane of the point of attachment to the picker-staff the series of teeth which are carried by a staff may be spaced at shorter intervals. The tooth described requires no molding, casting,
45 or forging, and consists simply of a bent rod, and hence while practically of double the capacity of an ordinary tooth it may be made at much less cost.

In connection with the standard 10, by which the front portion of the frame is supported, I preferably employ a locking device
50 consisting of a latch 81, adapted to engage either of a plurality of sockets 82 in the standard, and connected with said latch is an operating-cord 83, which extends through suitable guides and upward to the point of discharge of the carrier mechanism, whereby an operator located upon the load may disengage the latch to allow the desired vertical
55 adjustment of the machine-frame by means of the lever 11 for that purpose.

It will be understood that the described machine may be and preferably is used for lifting and loading hay from windrows and that in constructing the same particular attention should be given to adapting the width
65 of the frame to that of the apron or carrier, whereby the hay may not find its way be-

tween the side edges of the apron or carrier and the adjacent portions of the frame.

In practice various changes in the form, proportion, size, and minor details of construction within the scope of the appended claims may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Having described my invention, what I claim is—

1. In a hay-loader, the combination with a main frame, supporting-wheels, and picker mechanism, including a cylinder, of carrier
80 mechanism having a carrier-frame comprising side bars swiveled to the main frame on vertical pivots, and braces pivotally mounted at their upper ends upon the carrier-frame and detachably engaged at their lower ends
85 with the main frame, for supporting the carrier-frame in an inclined position, substantially as specified.

2. In a hay-loader, the combination with a main frame, supporting-wheels, and picker
90 mechanism, including a cylinder, of swiveled bearing-clips mounted upon the main frame, carrier mechanism having a carrier-frame of which the side bars are pivotally mounted in
95 said clips, and braces pivotally mounted at their upper ends upon the carrier-frame and provided at their lower ends with split pins for engagement with keepers on the main frame, substantially as specified.

3. In a hay-loader, the combination with a
100 main frame, supporting-wheels, and picker mechanism, including a cylinder, of swiveled bearing-clips mounted upon the main frame, carrier mechanism having a carrier-frame of
105 which the side bars are pivotally mounted in said clips, and braces for supporting the carrier-frame in its operative or inclined position, substantially as specified.

4. In a hay-loader, the combination with a main frame, supporting-wheels, and picker
110 mechanism, including a cylinder, of carrier mechanism having a carrier-frame of which the side bars have pivotal connection with the main frame in rear of the main-wheel axle, means for holding the carrier-frame in
115 its operative position, and extensible carrier-apron guides connecting the carrier-frame, near its upper end, with the main frame in advance of the ground-wheel axle, substantially as specified.

5. In a hay-loader, the combination with a main frame, supporting-wheels, and picker
120 mechanism, including a cylinder, of carrier mechanism having a carrier-frame of which the side bars have pivotal connection with the main frame in rear of the main-wheel axle, means for holding the carrier-frame in
125 its operative position, and extensible carrier-apron guides having members terminally and pivotally connected respectively to the carrier and main frame, and connected for relative sliding movement, substantially as specified.

6. In a hay-loader, the combination with a

main frame, supporting-wheels, and picker mechanism, including a cylinder, of swiveled bearing-clips mounted upon the main frame, carrier mechanism having a carrier-frame 5 comprising side bars mounted at their lower ends in said clips and connected at their upper ends by a transverse brace, bracket-bars rising from said frame-bars, guards arranged in the planes, respectively, of the side bars and 10 supported by said bracket-bars, transverse bars connecting said bracket-bars, and holding-bars loosely connected with and supported by the transverse bars and adapted for vibratory movement toward and from the plane of 15 the carrier-apron, substantially as specified.

7. In a hay-loader, the combination with a main frame provided at its rear end with ground-wheels, and picker and carrier mechanisms, of a vertically-adjustable standard 20 arranged at the front end of the main frame, a lever fulcrumed at an intermediate point upon the main frame and having a bearing at one end upon the upper end of said standard, and a windlass flexibly connected with 25 the other end of the lever, substantially as specified.

8. In a hay-loader, the combination with a supporting-frame, ground-wheels, and carrier mechanism comprising a carrier-frame hav- 30 ing side bars swiveled to the main frame on vertical pivots, of picker mechanism having a cylinder comprising heads, and picker-staffs mounted to rock in said heads and provided with cross-heads, operating and folding 35 cams mounted upon the supporting-frame, in the paths of said cross-heads and movable concentric with the axis of the cylinder, and means for securing said cams in an adjusted position, substantially as specified.

9. In a hay-loader, the combination with a supporting-frame, ground-wheels, and carrier mechanism including a carrier-frame of 40 which the side bars are swiveled to the supporting-frame on vertical pivots, of picker mechanism having a cylinder comprising 45 heads, and picker-staffs mounted to rock in said heads and provided with cross-heads, operating and folding cams pivotally mounted upon the supporting-frame concentric with 50 said cylinder, and connected for simultaneous adjustment, said cams being arranged in the paths of said cross-heads and respectively inside and outside of the paths of the picker-staff spindles, and means for securing the 55 cams in an adjusted position, substantially as specified.

10. In a hay-loader, the combination with a supporting-frame, ground-wheels, and carrier mechanism including a carrier-frame of 60 which the side bars are swiveled to the supporting-frame on vertical pivots, of picker mechanism having a cylinder comprising heads, and picker-staffs mounted to rock in 65 said heads and provided with cross-heads, operating and folding cams arranged in the paths of said cross-heads, and respectively inside and outside of the paths of the picker-

staff spindles, and cushions arranged at the front ends of the operating-cams for receiving the impact of the cross-heads, substantially as specified. 70

11. In a hay-loader, the combination with a supporting-frame, ground-wheels, and carrier mechanism, of picker mechanism having a cylinder comprising heads, and picker-staffs 75 mounted to rock in said heads and provided with cross-heads, operating and folding cams arranged in the paths of said cross-heads, and respectively inside and outside of the paths of the picker-staff spindles, a hanger supporting the adjacent ends of said cams and mount- 80 ed for swinging movement concentric with the picker-cylinder, and yielding cushion-spring arranged at the front ends of the operating-cams to receive the impact of the cross- 85 heads, substantially as specified.

12. In a hay-loader, the combination with a supporting-frame, ground-wheels, and carrier mechanism, of picker mechanism having a cylinder comprising heads, and picker-staffs 90 mounted to rock in said heads and provided with cross-heads, operating and folding cams arranged in the paths of said cross-heads, and respectively inside and outside of the paths of the picker-staff spindles, a hanger supporting the adjacent ends of said cams and mount- 95 ed for swinging movement concentric with the picker-cylinder, and means for securing the cams in an adjusted position, substantially as specified. 100

13. In a hay-loader, the combination with a supporting-frame, ground-wheels, and carrier mechanism, of picker mechanism having a cylinder comprising heads, and picker-staffs 105 mounted to rock in said heads and provided with cross-heads, operating and folding cams arranged in the paths of said cross-heads, and respectively inside and outside of the paths of the picker-staff spindles, said cams having 110 a sliding connection at their remote ends with the supporting-frame, a hanger supporting the adjacent ends of the cams and mounted for swinging movement concentric with the picker-cylinder, and means for securing the 115 cams in an adjusted position, substantially as specified.

14. In a hay-loader, the combination with a supporting-frame, ground-wheels, and carrier mechanism, of picker mechanism having a cylinder comprising heads, and picker-staffs 120 mounted to rock in said heads and provided with cross-heads, hangers mounted for swinging movement upon the spindle of the picker-cylinder, operating and folding cams connected at their adjacent ends to said hangers 125 and provided adjacent to their remote ends with longitudinal slots, and clamping devices engaging said slots and adapted when loosened to allow adjustment of the cams concentric with the axis of the picker-cylinder, substan- 130 tially as specified.

15. In a hay-loader, the combination with a supporting-frame, ground-wheels, and carrier mechanism, of picker mechanism having a

cylinder comprising heads and picker-staffs mounted to rock in said heads and provided with cross-heads, hangers mounted upon the spindle of the picker-cylinder, operating and folding cams arranged in the paths of said cross-heads, connected at their adjacent ends to said hangers, and spaced apart to allow the cross-heads to pass therebetween, and slotted adjacent to their remote ends, clamping devices for engaging the slotted portions of the cams, and securing them in a fixed position with relation to the supporting-frame, and adjustable braces connecting the lower ends of the hangers with the supporting-frame, substantially as specified.

16. In a hay-loader, the combination with a supporting-frame, ground-wheels, and carrier mechanism, of picker mechanism having a cylinder comprising heads, and picker-staffs mounted to rock in said heads and provided with cross-heads, hangers mounted upon the spindle of the picker-cylinder, operating and folding cams arranged in the paths of said cross-heads, connected at their adjacent ends to said hangers and spaced apart to allow the cross-heads to pass therebetween, and slotted adjacent to their remote ends, clamping devices for engaging the slotted portions of the cams, and securing them in a fixed position with relation to the supporting-frame, and adjustable braces extending from the supporting-frame to the hangers and engaged at their lower ends by clamping-bolts, substantially as specified.

17. In a hay-loader, the combination with a supporting-frame, ground-wheels, and carrier mechanism, of picker mechanism having a cylinder comprising heads, and picker-staffs mounted to rock in said heads and provided with cross-heads, hangers mounted for swinging movement upon the spindle of the picker-cylinder, segmental operating-cams secured at their lower ends to said hangers and longitudinally slotted adjacent to their upper ends, folding cams arranged at their lower ends adjacent to the lower ends of the operating-cams and longitudinally slotted at their upper ends, clamping-bolts engaging the slots of said cams, adjustable braces extending rearward and upward from the lower extremities of the folding cams to the plane of the main frame, and means for securing said braces in an adjusted position, the same consisting of clamping-bolts on the hangers engaging slots in said braces, substantially as specified.

18. In a hay-loader, the combination with a supporting-frame, ground-wheels, and carrier mechanism including a frame, the bars of which are swiveled to the supporting-frame on vertical pivots, of a picker-cylinder, to the spindle of which said ground-wheels are connected, said picker-cylinder having terminal heads provided with polygonal rims, and picker-staffs having spindles mounted in bearings in said heads and provided beyond the planes of the cylinder-heads with cross-

heads, operating and folding cams arranged in the paths of said cross-heads and spaced apart to allow the cross-heads to pass therebetween, and crank-arms connecting the picker-staffs with their spindles and mounted for swinging movement in the vertical planes of the rims of the cylinder-heads, substantially as specified.

19. In a hay-loader, the combination with a supporting-frame, ground-wheels, and carrier mechanism including a frame, the bars of which are swiveled to the supporting-frame on vertical pivots, of a picker-cylinder having heads provided with polygonal rims, picker-staffs, picker-staff spindles mounted in bearings in the cylinder-heads and provided beyond the planes of the cylinder-heads with cross-heads, crank-arms extending inwardly from said spindles and arranged in the vertical planes of the rims of the cylinder-heads, guide-pins carried by said crank-arms and having the body portions of the picker-staffs mounted thereon, cushion-springs coiled upon the guide-pins, and operating and folding cams arranged in the paths of the cross-heads and spaced apart to allow the cross-heads to pass therebetween, substantially as specified.

20. In a hay-loader, the combination with a supporting-frame, ground-wheels, and carrier mechanism including a frame, the bars of which are swiveled to the supporting-frame on vertical pivots, of a picker-cylinder having heads, picker-staffs, picker-staff spindles mounted in said heads and provided at their outer ends with cross-heads and at their inner ends with crank-arms extending inwardly of the cylinder, guide-pins carried by said crank-arms and having the picker-staffs mounted thereon, loose-coiled cushion-springs arranged upon said guide-pins and connecting the picker-staffs with the inner ends of the crank-arms for allowing outward and inward yielding movement of the picker-staffs, and operating and folding cams arranged in the paths of said cross-heads and spaced apart to allow the cross-heads to pass therebetween, substantially as specified.

21. In a hay-loader, the combination with a supporting-frame, and a carrier mechanism including a frame, the bars of which are swiveled to the supporting-frame on vertical pivots, of a picker mechanism comprising a picker-cylinder having heads, picker-staffs connecting said heads, spindles mounted in the cylinder-heads for rocking movement, crank-arms extending inwardly from the spindles and terminating in ears, guide-pins carried by said ears and arranged parallel with the crank-arms, ferrules affixed to the extremities of the picker-staffs and provided with guide-openings for said crank-arms and guide-pins, said ferrules and ears being provided with loops or eyes, and loose-coiled springs arranged upon the guide-pins and terminally engaged with said loops or eyes, and means for rocking the picker-staffs at in-

tervals to arrange them alternately in their operative and folded positions, substantially as specified.

22. In a hay-loader, the combination with a supporting-frame having swiveled bearing-clips mounted thereon and carrier mechanism including a frame comprising side bars pivoted in said clips, of picker mechanism including a cylinder having cylinder-heads, picker-staffs having spindles mounted in bearings in the cylinder-heads, and provided with flattened portions or seats, armed cross-heads arranged in contact with said seats and provided with dovetailed or undercut pro-

jections for overlapping and engaging the adjacent portions of the surfaces of the spindles, and operating and folding cams arranged in the paths of said cross-heads and spaced apart to allow the cross-heads to pass therebetween, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

SAMUEL FERGUSON.

Witnesses:

JOHN H. SIGGERS,
ROBT. E. CRUMP.